



How science can support a swift, health-based implementation of the new EU clean air law

A METEOR Cluster science-to-policy briefing

Introduction

Air pollution is the top environmental threat to health in the European Union (EU). It causes hundreds of thousands of premature deaths each year and worsens diseases like heart and respiratory conditions, leading to significant annual health costs.¹ Although targeted EU policies and initiatives in the energy, transport, or household sectors have improved air quality, the health and economic burden is still too high, especially in cities.²



The Ambient Air Quality Directive (DR 2008/50/EC,³ abbreviated AAQD) is at the core of comprehensive EU legislative frameworks to cut down on air emissions and improve the quality of the air that people breathe. The Directive sets legally binding limits for the major air pollutants threatening health and the environment (hourly, daily, annual maximum concentrations). It also requires member states to monitor air quality and to take measures if legal limits are exceeded.⁴

The Directive was revised between 2021 and 2024 to better align with the World Health Organization's (WHO) recommendations.⁵ The revised law, agreed upon in negotiations on 20 February 2024 and formally adopted on 14 October 2024, includes stricter clean air standards, new provisions on governance and enforcement, refined monitoring and assessment requirements, as well as strengthened information and communication rules.⁶ Science on the health impacts of air pollution was a key driver in updating this law.

This briefing published by the [METEOR cluster](#) demonstrates how science can continue to play a crucial role by supporting the implementation of ambitious clean air policies in member states to protect people's health across the EU. METEOR is a cluster of five Horizon Europe projects researching the health impacts of environmental stressors, such as air and noise pollution, chemicals, and related socioeconomic costs. Together they lay out a broad and detailed view of how health is impacted by the environment and suggest policy recommendations to protect our health and the planet.⁷



Funded by
the European Union

METEOR is funded by the European Union's Horizon Europe programme

Key messages

- Air pollution is the top environmental threat to people's health across the EU. Policymakers^a need to take urgent and decisive measures to address this threat.
- Achieving cleaner air across the EU is possible by 2030 if decisive measures are taken over the next few years to protect public health.
- Existing evidence shows that everyone's health is at risk. Certain groups, however, are more vulnerable to air pollution, such as children,⁸ the elderly, people with pre-existing conditions, and those experiencing socio-economic health inequalities,⁹ highlighting the need for preventative measures. The body of evidence on the health effects of air pollution is well-established and includes heart disease, chronic obstructive pulmonary disease (COPD), lung cancer, and asthma.
- Ongoing research will shed further light on how socio-economic inequalities in and between EU member states and in the European region impact exposure to air pollution and related health issues.
- European countries could save billions in health costs by taking action to reduce air pollution – the cost of inaction is much higher than the cost of air pollution reduction measures.^{10,11}

^a In this briefing, 'policymakers' refers to any members of the government or administration involved in the development and implementation of clean air policies, specifically the AAQD. This includes EU, national, regional or local authorities.



Why ambitious clean air policies are needed sooner rather than later

The recent update of the WHO air quality guidelines,¹² based on systematic and comprehensive reviews of existing scientific evidence, confirmed that air pollution causes cardiovascular and respiratory disease, as well as cancer. Poor air quality is also a risk factor for the development of diabetes¹³ and neurological disease. Health effects occur even at very low concentration levels, below current EU limit values.¹⁴ WHO recommends lowering maximum concentrations for major air pollutants, both in daily and annual averages, for PM10, PM2.5 (particles less than 10 and 2.5 µm in diameter), and NO2.

In recent years, evidence of the health risks from air pollution for vulnerable groups, including how it hinders children's healthy development, has significantly increased.¹⁵ Studies show that socio-economic inequalities – in a city, region, or country, and between countries – lead to unequal exposure and thus unequal health impacts.¹⁶ For example, Eastern European countries states face a higher health burden from poor air quality.¹⁷

Air pollution and climate change are interlinked. Air pollution worsens health impacts during heatwaves (which will become more frequent and more severe), with people with cardiovascular and respiratory disease particularly at risk.¹⁸

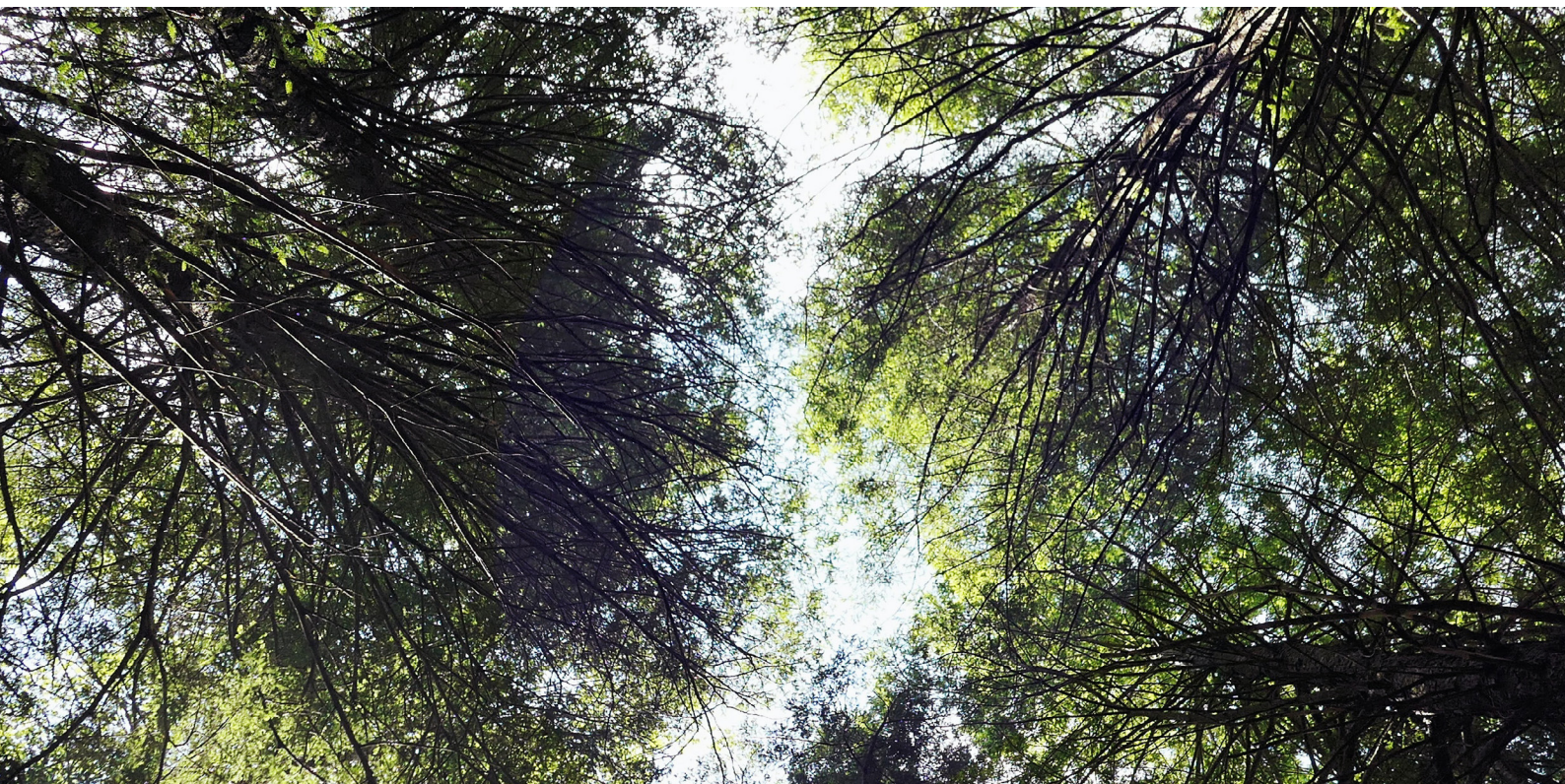
As research reveals more health impacts and interactions among various environmental factors, it underscores the urgent need for policymakers to enhance their efforts in ensuring cleaner air for all.

Towards more ambitious clean air standards

What has changed in the revised Ambient Air Quality Directive?

In April 2024, the European Parliament voted in favour of the provisional agreement reached in trilogue on the revision of the AAQD. By confirming this provisional agreement, the Parliament took one step closer to adopting legislation that will better protect people's health across Europe.^{19, 20}

- The agreement sets stricter limits for harmful pollutants, including particulate matter (PM2.5 and PM10) and nitrogen dioxide (NO₂). The new annual limit for PM2.5 (which is important to prevent long-term, chronic impacts from air pollution) is now 10µg/m³, while the new annual limit for NO₂ is 20µg/m³. These new limits are less strict than the 2021 WHO Air Quality Guidelines.
- Member states can request a delay of five years for the new limits if projections show they cannot meet them, or of ten years if meeting them requires replacing a considerable fraction of domestic heating systems.
- National and local authorities have to monitor air quality at rural and regional sites, including supersites (a monitoring station that gathers long-term data on several pollutants from multiple sampling points). This may involve monitoring for ultrafine particles or black carbon.
- Member states need to draft air quality roadmaps to outline the short and long-term measures they will implement to comply with the new 2030 limits. If they do not currently meet the standards, national/local authorities will also have to draft air quality plans for short-term measures to curb air pollution. New incentives to tackle air pollution across borders are also included.
- New requirements are introduced to better inform the public, especially vulnerable groups. These include harmonising existing air quality indices and providing information on potential health impacts if clean air measures are delayed.
- The revised AAQD also introduces new rules that allow people to seek legal action and claim compensation if they consider they suffered health harm because a member state failed to take clean air measures.
- Regular reviews of the Directive are foreseen at five-year intervals, with an initial review in 2030.



Key ways science informed the new EU directive

- Evidence and recommendations from the WHO air quality guidelines played a decisive role in the European Parliament calling for the full alignment of EU air quality standards with WHO's recommendations by 2035, as reflected in the September 2023 European Parliament negotiating position.²¹
- Research indicating that delaying air quality rules for ten years could cost an extra 327,600 lives and exacerbate inequities across Europe²² as well as analysis that the social and economic costs of inaction are far greater than taking ambitious action²³ played a key role in the trilogue negotiations between EU member states, the European Parliament, and the European Commission between November 2023 and February 2024. This evidence contributed to stricter exemption criteria for member states seeking to postpone complying with the clean air standards set for 2030.^b
- The European Commission highlighted that the economic benefits of revised clean air standards outweigh the cost of measures to address air pollution, in the impact assessment underpinning the legislative proposal.²⁴

^b The Council's negotiating mandate from November 2023 included an exemption in Article 10 for member states with a national GDP below the EU average. In the trilogue agreement of February 2024, this exemption was changed. Now, a member state can request an exemption only if it needs to replace a significant portion of domestic heating systems, with GDP no longer being a criterion.



Putting the new clean air standards into practice to protect public health

How METEOR projects can help policymakers implement the AAQD



Supports policymakers to design clean air measures and evaluate those that are most beneficial to health, by:

- Demonstrating how different sectors contribute to poor air quality
- Providing additional monitoring data
- Supporting air quality modelling and projections
- Generating evidence on the health and socio-economic benefits of AAQD implementation
- Organising stakeholder consultation workshops

[Learn more about METEOR](#)

The projects



BEST-COST (Burden of disease based methods for estimating the socio-economic cost of environmental stressors) develops methodologies to quantify the health and economic impacts of air and noise pollution, as well as the resulting inequalities.

By enabling a harmonised approach to understand the health burden, economic costs, and social and health inequalities of air and noise pollution, this project will help policymakers to implement equitable and effective air quality measures and develop policies that reduce pollution and strengthen public health resilience.

[Learn more about BEST-COST](#)



MARCHES (Methodologies for assessing the real costs to health of environmental stressors) uses high-resolution atmospheric modelling to identify how air pollutant emissions from different sectors, such as industry, transport, household heating, and farming, impact air quality.

By providing evidence on the relative contributions of each sector, MARCHES will help public authorities understand the economic and health costs associated with these emissions, enabling them to adopt targeted measures for the most significant sources and implement cost-effective measures to tackle air pollution.

[Learn more about MARCHES](#)



MISTRAL (A toolkit for dynamic health Impact analysis to predict disability-related costs in the aging population based on three case studies of steel-industry exposed areas in Europe)

aims to create a dynamic health impact assessment using AI algorithms to predict disability-related costs in aging populations exposed to pollution (near steel plants in three European countries: Italy, Poland, Belgium). The project aims to create robust predictive models, forecasting the burden of chronic disease linked to urban and industrial air pollution exposure.

This innovative tool will assist policymakers in forecasting health impacts and improving quality of life, thereby guiding the development and monitoring of health policies related to air quality especially for elderly populations. The project will also provide real-time data from a monitoring network of indoor and outdoor sensors.

[Learn more about MISTRAL](#)



UBDPOLICY (The urban burden of disease estimation for policy making) focuses on estimating the health and socioeconomic costs and benefits of air quality improvements in nearly 1000 European cities.

By providing detailed health impact assessments (and evidence on the benefits of reaching new EU air quality limits, especially in the project's eleven case study cities across the EU), this project will help urban decision-makers implement effective clean air measures and gain public support for these initiatives. In addition, the project will gather policy-makers requests for data in targeted stakeholder consultation workshops in case study cities and at EU level.

[Learn more about UBDPOLICY](#)



VALESOR (Valuation of environmental stressors) translates variations in emissions, pollutant concentrations, and exposure into quantified health impacts and economic effects using a multi-stressor economic valuation model.

This will allow policymakers to assess the monetary damage from air pollution and cost savings from tackling it. It will also help them communicate the benefits of planned policy actions and raise awareness about the health and economic impacts of sustained air pollution, thereby supporting informed decision-making.

[Learn more about VALESOR](#)

Policy recommendations

1. Take urgent and decisive measures to **address air pollution as the top environmental threat to people's health** in the European Union. This includes a swift implementation of the revised EU Ambient Air Quality Directive.
2. Consider establishing a plan or process on how the latest scientific evidence on air and health monitoring, modelling, or economic valuation will be considered **in the implementation of the revised EU Directive**, in an integrated way.
3. Consider how research and the latest science can support **fully aligning EU clean air standards with the 2021 WHO air quality guidelines**, as a significant step to achieving cleaner air for all.
4. Pay **specific attention to socio-economic inequalities and vulnerability** to air pollution in the implementation of the EU Ambient Air Quality Directive and adopt a preventative approach.



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